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NEW HAMPSHIRE COLLEGE

AGRICULTURAL EXPERIMENT STATION

POTATOES

Varieties Fertilizers Scab

BY F. WM. RANE AND LEIGH HUNT

NEW HAMPSHIRE COLLEGE
OF
AGRICULTURE AND THE MECHANIC ARTS
DURHAM

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OF

AGRICULTURE AND THE MECHANIC ARTS

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EXPERIMENTS WITH POTATOES

BY F. WM. RANE AND LEIGH HUNT.

The potato is more commonly grown and used than any other vegetable. Scarcely any farm or garden is without them. Owing to this fact, growers have exerted themselves to get new varieties, many of which are identical with old ones, except that they are given other names. One person, for instance, finds that in a few years his Early Rose is superior to those of his neighbors, and therefore distinguishes it by a new name. Not all new varieties come about in this way, however, as we have some noted men who are worthy the title of potato-breeders or originators.

In taking up the study of the potato during the past season at this Station, we did not deem it necessary to enter into the whole subject in detail. Methods of culture, size of cuttings to use, various insecticides and fungicides recommended for both tops and tubers, fertilizers, etc., have been very fully experimented on in recent years by various authorities, and we have their valuable experience to begin with.

The work upon which this report is based is as follows, in outline:

1. Comparison of varieties.
2. Difference in effect of muriate and sulphate of potash upon potatoes.
3. Potato seed treated with corrosive sublimate as compared with that untreated.

1. COMPARISON OF VARIETIES

This being our first season's test, we desire to state that it is offered only that others may make use of it in comparison with their own experience. Just because a certain variety has given

a fair yield this year, it does not follow that it will do equally well next season. The causes of variation from year to year in the same variety cannot be due to the soil alone. It is not uncommon to be able to select two hills of the same variety side by side, the one far more productive than the other.

Some varieties of potatoes, as the Rural New Yorker No. 2, American Wonder, Early Rose, White Star, etc., have sufficient merit to gain a generally good reputation, while others become valuable only locally. These facts are found out only by trial tests.

The accompanying photograph, Figure 1, will give a fair idea as to the characteristic, form, and appearance of each of the eighty varieties under test the past season. The number above each potato refers to the same number before its name in the table. That specimen was selected that contained the most decidedly typical characteristics of its variety.

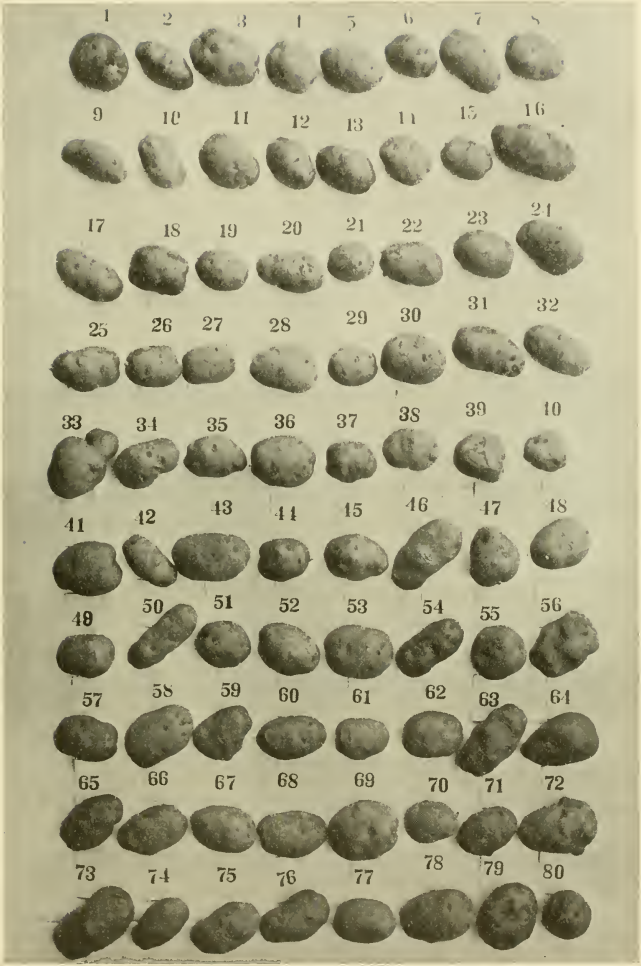

FIG. 2—Varieties of Potatoes.

TABLE I.—Comparison of Varieties of Potatoes. (Yield Per Acre Calculated from Forty-eight Feet of row, and Four Pounds of Seed.)

Number.	Variety.	Yield per acre.	Number.	Variety.	Yield per acre.
1	Uncle Sam (2 lbs. to 36 ft. of row)	214	41	King of the Roses	309
2	American Wonder	240	42	Koshkonong	227
3	Banner	273	43	Late Puritan	316
4	Blush	272	44	Leonard's Favorite	307
5	Brownell's Winner	305	45	Maggie Murphy	201
6	Burpee's Extra Early	215	46	Money Maker	223
7	Burpee's Superior	209	47	Mill's Endurance	118
8	Bill Nye	195	48	New Queen	289
9	Bracey's Rising Sun	165	49	Ohio Jr	256
10	Carman, No. 1	230	50	Orphan	240
11	Carman, No. 3	239	51	Parker's Market	255
12	Champion	152	52	Polaris	242
13	Clark's No. 1	193	53	Peerless Jr	219
14	Clay Rose	243	54	Prize Taker	274
15	Crown Jewel	223	55	Pride of Ireland	237
16	Country Gentleman	270	56	Queen of the Valley	315
17	Delaware	214	57	Quick Crop	342
18	Dewdrop Rose	258	58	Reeve's Rose	453
19	Early Harvest	248	59	Rochester Rose	263
20	Early Market	99	60	Rupert's Perfection	303
21	Early Norther	244	61	Rutland Rose	209
22	Early Puritan	198	62	Rural New Yorker, No. 2	247
23	Early Rose	267	63	Rose, No. 9	149
24	Early Six Weeks	119	64	Seneca Beauty	300
25	Everitt	160	65	Sir William	354
26	Early Fortune	148	66	Somerset	229
27	Early Wisconsin	233	67	Salzer's World's Fair	243
28	Early Thoroughbred	220	68	Victor Rose	271
29	Freeman	174	69	Vick's Perfection	394
30	Farmer's Alliance	246	70	Vaughan	325
31	Good News	232	71	Vick's Advancer	171
32	Great Divide	224	72	White Star	307
33	Green Mountain	180	73	White Mountain	323
34	Harbinger	155	74	White Rose	399
35	Houlton Rose	305	75	Wilson's Fair Choice	257
36	Harvest Queen	287	76	Woodhull's Seedling	329
37	Howe's Premium	140	77	World's Fair	184
38	Honeoye Rose	224	78	Woodbury White	373
39	Irish Cobbler	301	79	White Ohio	232
40	Irish Daisy	154	80	Governor Rusk	375

The potato plot was a good loam soil, grading into a light clay towards the south and east. A crop of millet was grown upon the land in 1895, and potatoes in 1894. In the spring of 1896 a light coating of cow manure and a heavy application of a complete potato fertilizer were spread upon the plot. The land was furrowed, and the potato seed cut in the ordinary manner, two or three eyes to each piece, and two pieces dropped every two feet. At the second hoeing, the rows were partly hilled. After

the bugs appeared, the vines were treated three times with Paris green, and twice sprayed with Bordeaux mixture. The second and third time that Paris green was used, it was stirred into the Bordeaux mixture.

May and June were cool, dry months, and potatoes started slowly. While the rest of the season was sufficiently wet, there was no continuous moist, muggy weather to induce late blight and rot.

TABLE II.—The Fifteen Heaviest Yielders, in Order of Productiveness.

Number.	Varieties.	Yield per acre.
58	Reeve's Rose	453
74	White Rose	399
69	Vick's Perfection	394
80	Governor Rusk	375
78	Woodbury White	373
65	Sir William	354
57	Quick Crop	342
76	Woodhull's Seedling	329
70	Vaughan	324
73	White Mountain	323
43	Late Puritan	316
56	Queen of the Valley	315
41	King of the Roses	310
44	Leonard's Favorite	307
72	White Star	306

NOTES ON VARIETIES.

1. *Uncle Sam* (Henderson).—This variety was first put upon the market last season. The introducers claim it to be a heavy yielder, of uniform shape and size, and superior in cooking qualities, which claims seem to be well-founded—from our results the past season. It made strong, healthy vines, continued to grow late, and yielded well. The tubers were oval in shape, of handsome appearance, and but few small ones. Skin mostly a clean white, with a somewhat russetty appearance. It ripens with Rural New Yorker. All things considered, this potato gives great promises for the future. Mr. H. N. Hammond, a seedsman and potato-grower of Michigan, says: "Heretofore, I have considered the Carman, No. 3, the most perfect of all late varieties I have tested, but from one season's trial, I must admit

that Uncle Sam even surpassed Carman, No. 3, in wonderful growth, in yield, and last, but not least, in quality."

2. *American Wonder.*—Within the past few years, this variety has been very generally grown. From general reports, it stands up well in productiveness. The vines are very vigorous, and do not blight readily. The potatoes are white; medium to large; quite uniform in size, and regular in shape. Its yield at the Michigan Station, in 1895, was 379 bushels, with an average yield for four years of 242 bushels. At the Ohio Station, in 1895, it yielded 276 bushels, with an average yield for two years of 222 bushels. Our yield the past season was 240 bushels.

3. *Banner* (Livingston).—This potato is of very pleasing appearance. It does not appear to have the fixed characteristics that mark other stable varieties; the eyes are both shallow and deep, and the color not sufficiently uniform. It was above the average in productiveness.

4. *Blush.*—A very vigorous, red and deep-eyed variety. Fairly productive, and medium early; round to oblong in shape.

10. *Carman, No. 1* (Thorburn, 1894).—This variety was introduced in 1894, and is one of Carman's seedlings. The vines were large, with far spreading branches, making a thick foliage. The tubers were numerous but not large, running from medium to small, and usually oval in form, squaring off at the ends. The eyes were shallow; color, white. It ripened in midseason. Its greatest drawback seemed to be its setting more tubers than could be matured of fair size. It is reported by others as out-yielding and giving better size than the Rural New Yorker, No. 2.

Carman, No. 3 (Thorburn, 1895).—This variety is widely and favorably known, because of its very general introduction and growth in 1895. It is another seedling of Mr. Carman's, and resembles in appearance of growth the Rural New Yorker, No. 2, with purple sprouts, purple blossoms, and dark-colored stalks. It is a late variety. The shape is somewhat longer than that of the Rural New Yorker, No. 2. There were but few small tubers.

14. *Clay Rose.*—This potato is a late red variety. It is claimed to be specially adapted for stiff clay soils. It was small and short in shape, and eyes rather deep. Not promising.

16. *Country Gentleman* (Jerrard, 1896).—This potato was

introduced the past season by Mr. Jerrard, of Caribou, Me. It grew very well during the fore part of the season, but blighted early. The tubers were not very large, and of various shapes. It was a medium late, of rose color, with shallow eyes. Forty-three per cent. scabby.

21. *Early Norther* (Jerrard, 1892).—A medium early market variety. It resembles the Early Rose in general appearance. Was not very uniform in size and form this season.

28. *Early Thoroughbred* (Maule, 1896).—This newly introduced variety does not seem to have any points of special merit to recommend it. It may need a soil different in some respects from ours. The tubers were generally small, oblong, and not attractive. It belongs to the Rose family.

29. *Freeman* (Maule, 1891).—This variety is very highly flavored; tubers white; shape, round to oblong. It seems to require high culture. Potatoes too small for marketable purposes.

38. *Honeoye Rose* (Dibble, 1896).—Mr. Dibble offered this for the first time the past season, and says it is a seedling of the Victor Rose, which in turn was a seedling of the Reeve's Rose. It did not yield as well as either of its ancestors with us last season. The size was good, having but few small tubers; eyes, shallow. Promising.

41. *King of the Roses.*—A medium early, strong-growing variety, of good rose color; oblong in shape, resembling Reeve's Rose quite closely. Rather too large a proportion of small tubers. Good yield. Nine per cent. scabby.

43. *Late Puritan.*—A late, yellowish-colored variety, of vigorous habits of growth. The tubers long, uniform in size and regular in shape; fine appearance.

44. *Leonard's Favorite.*—Was fairly productive, of rose color, and with long, slender, spreading growth. A good early variety.

45. *Maggie Murphy* (Vick).—A midseason variety, pink in color, and quite widely grown. Its yield was light here this past season, but the tubers were mostly of marketable size. In some sections of the state it is reported as not being a good keeper, and of poor quality. Generally, it seems to be a favorite.

46. *Money Maker* (Dibble, 1895).—A long, white, cylindrical

potato, with a tendency to have protruding knobs. A rather large proportion of small potatoes.

50. *Orphan.*—A fine, long, slender, smooth, white potato; shallow eyes. Uniform in shape, size, and color. It presents a good appearance.

51. *Parker's Market* (Jerrard, 1895).—Oblong to cylindrical in shape. Red color; claimed to withstand rot, and adapted to heavy soil. Medium size, but too many small tubers.

53. *Peerless, Jr.*—Flat and rectangular in shape. Eyes shallow, and mostly at the tip end of tuber. All of good size. Resembles the Rural New Yorker, No. 2.

57. *Quick Crop.*—A potato of the Hebron type, although somewhat darker in color. Smooth, oblong, and of fair size; yield, good; a promising variety. It is grown mainly in the West.

58. *Reeve's Rose.* This variety is grown extensively by the Jersey and Long Island truckers. It was the most productive grown at the Station last season, but the percentage of large tubers was not as great as of some others; not so productive. It is rather deep-eyed, pink in color, slender and oblong in shape, and second early in ripening. Strong, vigorous tops.

63. *Rose, No. 9* (Dibble).—A late, red variety, introduced the past season by the Dibble Seed Company, who claim for it: "Our latest and best late red variety for general field culture." In their field test of 207 varieties, covering two years, this showed the best average yield of the red sorts. Its yield here was among the lowest. The tubers were of good size, but the greatest objection was its tendency to grow bumps, or protruding eyes upon the surface, and to scab readily. It may overcome these objections upon further trial.

65. *Sir William.*—A vigorous and prolific late variety. It is a strong grower, with vines erect and over three feet in length. Color, white; long, square ends. Its being late to mature frees it from the early blight. It stood sixth in rate of yield, but much nearer first in production of marketable potatoes. We are much pleased with it thus far. We find it highly spoken of by those who have tried it. Prof. W. J. Green, of the Ohio Experiment Station, after having grown it on different kinds of soils

for two years, says: "It is an almost ideal potato, both for home use and for market." Dr. I. B. Chamberlain, of the *Ohio Farmer*, claims it to be the best potato he ever grew. It was about twenty per cent. scabby with us this season.

FIG. 2.—Sir William Potato.

66. *Somerset* (Jerrard, 1895).—A rose-colored variety, ripening midseason, eyes rather deep. Only average in productiveness last season. The tubers run evenly, and make a good appearance. Quality excellent.

69. *Vick's Perfection.*—A second early variety, productive, color white, shape irregular, eyes both deep and shallow; no uniformity. A good many small tubers; sixteen per cent. scabby.

70. *Vaughan.*—Numerous tubers set, but did not reach sufficient size. Blighted early; twenty-seven per cent. scabby. Beauty of Hebron type.

72. *White Star.*—This old variety stood well in the test, giving a yield of 306 bushels per acre. The tubers were long, evenly cylindrical, and of a clean, white appearance. Vines rather slender and long, of late growth; four per cent. scabby.

73. *White Mountain.*—Healthy, vigorous grower; strongly resistant to early blight. Well-proportioned, large potatoes; twelve per cent. scabby, and these among the smaller tubers. Yield good.

74. *White Rose.*—The tubers were long and cylindrical, with very light pink, shallow eyes. A medium, second early potato, of the White Star type; yield heavy, but too many small tubers. The largest were not large.

79. *White Ohio* (Vick, 1896).—This is a seedling of the Early Ohio, only white in color. The introducers claim it to be the earliest white potato grown. It did not prove superior with us, although its general appearance was good. The yield was an average one, tubers flat and oblong in shape, and containing a fair proportion of small ones. Shallow eyes.

80. *Governor Rusk.*—A potato of nice appearance, smooth, long and cylindrical in shape, of reddish color, and very productive. The tubers averaged good size; the vines were strong and large; eighteen per cent. scabby. A desirable variety if it continues to do as well as this season. Ripens with the second early varieties.

2. MURIATE VS. SULPHATE OF POTASH.

It has been thought in recent years that although muriate of potash is the cheaper form of the potash salts, for the amount of fertilizer it contains, it nevertheless has some properties that render it undesirable for a number of vegetables, among them, potatoes. Experiments in Germany and at the Massachusetts Station, point very conclusively to this fact. We tested these two forms of potash on each of the eighty varieties of potatoes grown the past season, one half of each row being treated with sulphate, and one half with muriate. The other forms of fertilizer used, as phosphoric acid and nitrogen, were the same throughout. The results were as follows:

Of the eighty varieties, forty-seven gave a heavier yield with

sulphate, and thirty-three with muriate of potash. The total yield, however, was in favor of the muriate. The total weight of those grown with sulphate was 1,978 pounds and 7 ounces, and with muriate, 1,996 pounds and 9 ounces—making a difference of 18 pounds and 2 ounces in favor of the latter.

In comparing the percentage of large and small potatoes, there was but a slight difference. The weight of the large, or marketable, potatoes with sulphate was 1,567 pounds, and with muriate, 1,586 pounds, 19 pounds in favor of the latter. The small potatoes yielded 411 pounds with sulphate, and 409 pounds with muriate.

From the data obtained from this single year's test, little preference is shown for either of these forms of potash, as far as yield is concerned.

3. CORROSIVE SUBLIMATE TREATMENT FOR POTATO SCAB.

Most of the trials in treating the potato seed before planting with corrosive sublimate have proved it to be beneficial. During the past season, we tested its efficiency upon each of the eighty varieties grown. The soil, having been used for a potato crop two years previously, was inoculated with the disease. One half of each variety was placed in a coarse sack, and after soaking one and one-half hours in a solution, in the proportion of two ounces of corrosive sublimate to sixteen gallons of water, was taken out and drained off; then cut and planted. Throughout the fore part of the season the soil was comparatively dry, but during the remainder was very moist, and offered exceptionally favorable conditions for scab development, as it is well known that moisture favors its growth.

From the data secured, we arrive at the following results: Two varieties, Nos. 60 and 68, were free from scab with both treated and untreated seed. Two varieties, 3 and 58, showed the same percentage of scab under both conditions. Sixty-two varieties favored the treatment, while the remaining fourteen did not. The total average for those treated was $24\frac{5}{8}$ per cent. of scabby potatoes, while for those untreated it was $35\frac{1}{2}$ per cent. The efficiency of the treatment, therefore, was $10\frac{1}{8}$ per cent. Considering the fact that the soil was infected, and that

some manure was used, while the season also was favorable for scab development, the results seem marked in favor of corrosive sublimate. If applied to the seed of a variety that gave a yield of 300 bushels per acre, even under the unfavorable conditions mentioned, there would be 30 bushels more free from scab than otherwise. This treatment is very generally accepted as being sufficiently practical for recommendation.

SUMMARY REMARKS.

1. This being the first season's test, we hesitate recommending many of the varieties.

2. We feel little hesitancy, however, in recommending such as White Star, Rural New Yorker No. 2, American Wonder, Carman No. 3, Governor Rusk, and Sir William, as these have been reported on favorably from so many sections.

3. The fifteen varieties giving the heaviest yield, in order of productiveness, are given in Table II.

4. The ten varieties giving the least yield, in order, beginning with the poorest, are: Early Market, Early Six Weeks, Mill's Endurance, Howe's Premium, Early Fortune, Rose No. 9, Champion, Irish Daisy, Houlton Rose, and Bracey's Rising Sun.

5. The average productiveness of all varieties per acre was 244 bushels, the lowest being Early Market with 99 bushels, and the highest, Reeve's Rose, with 453 bushels.

6. There was very little difference in the effectiveness of muriate and sulphate of potash on potatoes. One appears to be about as effective as the other.

7. Those treated with corrosive sublimate gave on an average $10\frac{1}{8}$ per cent. less scab than those untreated; or about 25 bushels to the acre.

8. After we have selected a sufficient quantity for seed purposes, we shall be pleased to send, at the expense of the receiver, a limited quantity (a few potatoes) for test purposes, provided the person receiving them has had experience in potato growing, and will report his results as soon as the crop is harvested.

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